

## Reporting Systems

# Does Error and Adverse Event Reporting by Physicians and Nurses Differ?

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The Institute of Medicine's (IOM) report *To Err Is Human* concluded that tens of thousands of Americans die each year from errors in their medical care and hundreds of thousands are subject to nonfatal injuries that improved systems of care could prevent.<sup>1</sup> For this reason, the IOM and legislation have proposed expanding voluntary reporting of errors.<sup>2,3</sup> To address this need, some hospitals have instituted voluntary electronic error reporting systems (e-ERSs). An e-ERS provides an accessible and user-friendly way to gather data in a peer review-protected environment on the following:

- Medical errors (incorrect actions or plans for patient care that may or may not cause patient harm)
- Adverse events (patient injuries due to medical management and not necessarily an error)
- Near misses (errors that do not reach a patient)
- Issues concerning environment of care (situations that cause an unsafe environment of care)

Such a system allows for real-time review, oversight, and intervention; provides insight into hospital processes that need modification to reduce the likelihood of adverse hospital events; and addresses observed environmental issues.

Using chart reviews, the Harvard Medical Practice Study<sup>4</sup> and Thomas et al.<sup>5</sup> demonstrated that adverse events occur in 2.9% to 3.7% of all hospitalizations. The Harvard Medical Practice Study revealed that two thirds of adverse events are caused by errors in treatment and should be amenable to prevention through sound methods of error reduction.<sup>6</sup> The patient safety movement emphasizes the fact that most errors are due to breakdowns of the system and are not errors by individuals.<sup>7,8</sup>

An e-ERS offers an opportunity for the real-time collection of a large quantity of data on adverse hospital events; these data can be used to implement systemic policy changes to improve patient safety and care. Despite these benefits, physicians, including medical residents, have been poor error reporters.<sup>7-11</sup> For example, in a previous study of 26 acute care, nonprofit,

## Article-at-a-Glance

**Background:** Some hospitals have instituted voluntary electronic error reporting systems (e-ERSs) to gather data on medical errors, adverse events, near misses, or environmental issues in a peer review-protected environment. An e-ERS allows for real-time review, oversight, and intervention and provides insight into hospital processes in need of modification to reduce the likelihood of adverse hospital events. In a descriptive study of a standardized, Web-based reporting system, the reporting practices of physicians and nurses were compared.

**Methods:** Twenty-nine acute care hospitals and one long term care organization implemented an e-ERS between August 2000 and December 2005. The reporting system consisted of a secure, Web-based portal available on all hospital computers. Events were classified by the level of impact on the patient using a standard classification scheme. All reports that occurred from August 2000 through January 2006 were analyzed in aggregate analyses. Hospitals and patients were de-identified to study investigators.

**Results:** Some 266,224 events were reported over 7.3 million inpatient days—1 event per 27.5 days. Physicians were the reporters of 1.1% of total events, nurses 45.3%, and other hospital employees 53.6%. Physicians were more likely to be the reporter for events that caused permanent harm, near death, or death of a patient ( $p < .01$ ). Nurses were more likely to be the reporter for events that caused no or temporary harm ( $p < .01$ ).

**Discussion:** Physicians reported a narrower spectrum of events than nurses; they were more likely to report as the impact of events on patients increased but less likely to report fatal events. Nurses' reporting remained stable across impact levels. Differences exist between whether nurses and physicians report events; physicians must be encouraged to increase their reporting of adverse events.

nonfederal hospitals in the United States using an e-ERS, we noted that physicians submitted only 1.4% of the 92,547 reports, compared with 47% submitted by registered nurses.<sup>9</sup> This initial study suggested a difference between physician and nurse reporting, but we did not analyze the nature of this difference. Lower physician reporting, as compared with nurses, was also found in a smaller-scale study by Schuerer et al., who also found that physicians are more likely to report events that have caused harm.<sup>10</sup>

Physician underreporting of errors, which may hamper efforts to improve the system of care, might reflect uncertainty about what is a reportable event, a tendency to only report events that lead to adverse outcomes, or concern about implicating others or themselves.<sup>11,12</sup> Limited reporting may also be due to conflicting demands on physician time and the feeling that reporting these events are out of the scope of the physician's job. Alternate hypotheses of low physician reporting rates include shame of errors, fear of liability and malpractice suits, effects on reputation, and disapproval among peers.<sup>12-14</sup> These hypotheses imply that the physicians view the environment in which they practice as punitive.

In this study we examined errors reported by physicians versus nurses in terms of the severity of errors and whether or not they reached the patient. In our previous study<sup>9</sup> we analyzed a smaller data set (92,457 as compared with the 266,224 events in this analysis) that showed a difference between physician and nurse reporting, but we did not analyze the nature of this difference. We believe that further analysis of the e-ERS data will help us better understand the reporting patterns of physicians and nurses, information that is needed for the success of further outreach programs to increase reporting rates.

## Methods

### ORGANIZATIONS

We evaluated reports collected from a convenience sample of 29 acute care, nonprofit hospitals in 12 geographically dispersed states,<sup>9</sup> as well as one long term care organization, each organization having voluntarily implemented the same commercially available Web-based e-ERS for at least three months. Twenty-four hospitals were adult or adult/pediatric tertiary care centers, 2 were exclusively pediatric; 9 were academic medical centers; and 11 hospitals were in urban, 13 in suburban, and 2 in rural settings. Eighteen hospitals were part of hospital groups or health care systems.

The 29 organizations constituted the entire user group (which the vendor provided to us) of the vendor's event database, which they used as a component of their quality improve-

ment efforts. The earliest implementation began at one of the organizations in August 2000; the last implementation was accomplished in January 2004.

### REPORTING SYSTEM

The reporting system consisted of a secure, Web-based portal available on all hospital computers. Any individual with hospital system privileges for computer access could submit a report after a secure login. Any individual with access to the hospital computer system is able to, and were encouraged to, report. The reporting system leads the reporter through a series of standardized screens with pull-down response choices designed to collect information on event demographics including time, location, service, and personnel involved, as well as type of event, contributing factors, impact on patient care, and subsequent patient outcome. The reporting process took an average of 10 minutes to complete. Although reporting was not anonymous (so that follow-up details could be obtained), reports were peer review-protected at each hospital site. Reports could be accessed immediately after entry and could be amended to reflect information obtained from subsequent investigation, verification, and follow-up. Managers and executive leadership could also edit reports for accuracy during final review. On the basis of the nature of the database, the demographics of reporters remained unknown to the authors, limiting our analysis of characteristics of reporters.

### REPORT DEFINITIONS

**Event Type.** For each event reported, reporters specified one of the following major categories:

- Non-medication-related clinical (related to medical management, excluding administration, delivery, or reaction to medications)
- Medication/infusion (related to the administration, delivery, dosing, or reaction to medications)
- Administrative (related to system processes and infrastructure)
- Falls
- Other

**Impact Level.** Reporters were also asked to specify "impact level" on patients and their care on a scale of 0-10: (0) unknown; (1) safety/environment; (2) near miss; (3) no harm and no change in monitoring; (4) no harm but monitoring initiated or increased; (5) temporary harm not requiring additional treatment; (6) temporary harm, minimal treatment required; (7) temporary harm, major treatment/prolonged hospitalization required; (8) permanent harm; (9) life threatening/near

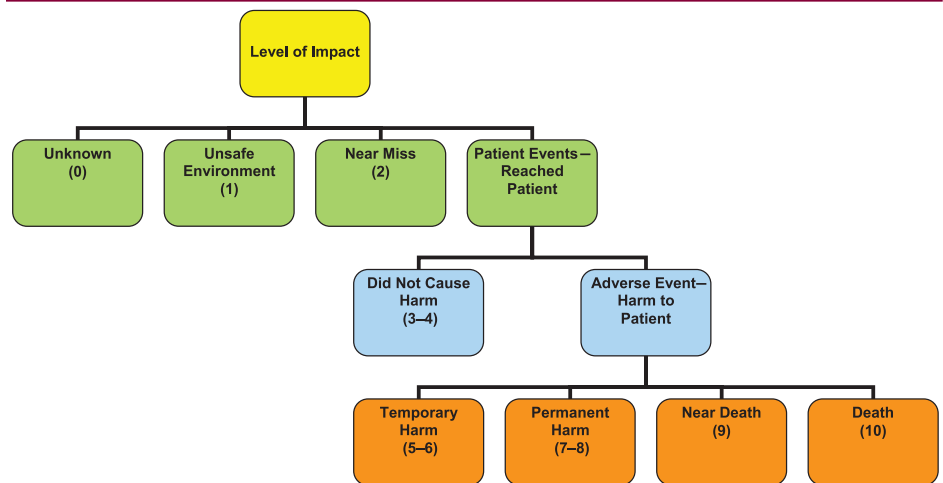
death or (10) death. The vendor of the e-ERS originated these categories on the basis of a national consensus of criteria, and the categories have been redefined since the system's inception in 2000.

**Reporter's Role.** Reports identified the reporter's role in the hospital. We consolidated reporters into three groups: physicians, nurses, and other reporters (including pharmacists, pharmacy technicians, laboratory technicians, unit clerks, and secretarial staff). We defined a physician reporter as an intern, resident, fellow, attending, or private practitioner. Nurse reporters included registered nurses, nurse practitioners, and nurse managers. We defined an academic hospital as any hospital that has house staff. At academic hospitals, we sub-classified physicians into attending physicians and physicians in training (including interns, residents, and fellows).

If two or more people submitted a report on the same incident, the reports were manually combined at the hospital in which they occurred; the merged report was randomly classified as a report submitted by one of the original parties. Once a report was created, it was a supervisor's responsibility to obtain more information about an incident and to close the report. We only had access to the data in these closed reports. Because we did not have access to the specific contents of reports, we were unable to identify these double reports and the additional reporters.

**Training.** Training of employees varied among the different organizations; however, we were not provided data about the training practices. At Tufts Medical Center, we described the use of the system during the orientation of all employees, including physicians and nurses. Both groups were encouraged to report, given that we created (using this e-ERS) a nonpunitive environment. Although the system was designed to be self-explanatory and does not require training to use, the culture to report does—and is currently evolving. Supervisors were trained to analyze these reported events. In this study, we only looked at events that were reported in the e-ERS; thus the term *events* only refers to those events that were reported. The true denominator of all events that occurred could not be determined.

## Classification of Events by Impact Level (in Parentheses)



**Figure 1.** Patient events were divided into those that did not cause harm (Impact Levels 3 and 4), those that caused temporary harm (Impact Levels 5 and 6), those that caused permanent harm (Impact Levels 7 and 8), those events that were life threatening (Impact Level 9) and events that were fatal to a patient (Impact Level 10).

## DATA ANALYSIS

All reports that occurred from August 2000 through January 2006 were included in aggregate analyses. Hospitals and patients were de-identified to the study investigators. We compared reports by physicians and reports by nurses within the broad categories of administrative, adverse clinical, falls, medication (including infusion), and other reports. Because nurses traditionally report falls<sup>15</sup> (a fact congruent with our data), we also determined the percentage of reports by nurses and reports by physician when falls were excluded. This allowed for a better comparison of nurse and physician reports because fall reporting would serve to skew our data.

For the purposes of this study, we differentiated between reports that were related to an unsafe hospital setting (Impact Level 1), reports that were near misses (Impact Level 2), and reports that affected the patient directly, designated as “patient events” (Impact Levels 3–10). We further divided patient events as shown in Figure 1 (above). While looking at patient impact level, we excluded those events whose impact was unknown (Impact Level 0).

To view the difference in reporting for events that reached the patient and had an impact on patient outcome, we examined the difference between events that reached the patient but did not cause permanent harm (Impact Levels 3–6) and those that caused permanent harm, near death, or death of a patient (Impact Levels 7–10).

To determine a “reporting ratio” of reports by physicians to reports by nurses, we compared the fraction of physician reports at a given level of impact to total physician reports with the fraction of nurse reports at the same level of impact to total nurse reports. We chose *not* to use a percentage of total reports at a given level of impact. A reporting ratio of 1.0 implies that this level of impact represents the same fraction of reports by physicians and by nurses. We feel that this measure allows for a better understanding of the types of reports that nurses and physicians submitted, while the alternate shows how nurses or physicians report compared with all other reporters. We performed a Chi-Square test with Bonferroni adjustments to determine if the reporting ratio was significantly different than 1.0.

## Results

### RATES

A total of 266,224 reports were evaluated over roughly 7.3 million inpatient days, translating into a rate of 36.5 reports per 1,000 inpatient days. Nurses were the reporter of 45.3% of reported events ( $n = 120,540$ ), physicians of 1.1% of reported events ( $n = 3,025$ ); the remainder of the reports was submitted by other hospital employees. Physician reporting was similar in academic (1.14%) and nonacademic (1.13%) hospitals, whereas nurses’ reporting was higher in nonacademic hospitals (51% of all reports) than in academic hospitals (42.5%;  $p < .01$ ). In academic hospitals, attending physicians submitted 73.5% of physician reports; the remainder was submitted by physicians in training (interns, residents, and fellows).

### CLASSIFICATIONS

**Event Categories.** Table 1a (below) depicts the breakdown of total reports by category for physicians and nurses and includes all 266,224 events. For physicians, analysis of variance (ANOVA) showed a significant difference ( $p < .05$ ) for event categories reported.

**Impact Level and Reporter.** Table 1b (page 541) depicts the breakdown of reports by impact level for physicians and nurses. Chi-square analyses showed significant differences ( $p < .01$ ) for both physician and nurse reporting between events that did not lead to permanent harm (Impact Levels 3–6) and those that led to permanent harm, near death, or death (Impact Levels 7–10). Analysis of variance (ANOVA) showed that there was no significant difference between nurse reporting rates for different event category levels ( $p = .26$ ).

**Aggregated Impact Level and Reporter.** Table 1c (page 541) shows that nurses were the reporter of 52.8% (versus 1.2% for physicians) of reports that reached patients but did not cause permanent harm and were the reporter of 31.1% (versus 3.5% for physicians) of reports that caused permanent harm, near death, or death ( $p < .01$ ). Chi-square analyses showed significant differences ( $p < .01$ ) for both physician and nurse reporting between events that did not lead to permanent harm (Impact Levels 3–6) and those that led to permanent harm, near death, or death (Impact Levels 7–10).

**Event Category by Level of Impact.** Table 1d (page 541) examines the classification of level of patient impact by category of event. For example, 28% of “unsafe environment” reports were “administrative”; 17% of “near misses” involved “medication/infusion”; and the majority of reports in the “temporary harm, permanent harm, near death, and death” categories were “adverse clinical.”

**Level of Impact by Event Category.** Table 1e (page 541) examines the classification of category of an event by level of impact on a patient. For example, 20% of fall reports were in the “no harm” category, whereas 17% caused “temporary harm”; 36% of “administrative” reports were “unsafe environment,” and 10% caused “no harm.”

**Event Category and Reporter.** As shown in Figure 2a (page 542), when physicians were the reporters, adverse clinical events accounted for 47.7% of the reports, whereas falls accounted for 1.9%. Nurses were the reporters of 75.4% of the

Table 1a. Reports According to Category of Event and Reporter

Event Category	Total Reports	% of Total	Reported by Physician	Reported by Nurse	Reported by Other
Administrative	45,945	17.26%	1.50%	43.35%	55.15%
Adverse clinical	97,296	36.55%	1.48%	35.49%	63.03%
Fall	34,145	12.83%	0.17%	75.41%	24.42%
Medication/Infusion	77,798	29.22%	0.91%	43.53%	55.55%
Other	11,040	4.15%	1.14%	60.01%	38.85%
Total *	266,224	100.00%	1.14%	45.33%	53.53%

\* Includes the 46,769 reports with an unknown level of impact.

**Table 1b. Impact Level by Reporter\***

Impact Level	Total Reports	% of Total	Reported by Physician	Reported by Nurse	Reported by Other
1: Unsafe environment	36,371	16.57%	1.26%	33.42%	65.31%
2: Near miss	26,497	12.07%	0.62%	26.09%	73.29%
3-4: No harm	104,753	47.73%	0.93%	51.78%	47.29%
5-6: Temporary harm	42,475	19.35%	1.85%	55.28%	42.87%
7-8: Permanent harm	8,102	3.69%	3.36%	30.35%	66.29%
9: Near death	535	0.24%	5.61%	35.33%	59.07%
10: Death	720	0.33%	3.19%	36.25%	60.56%
Total	219,453	100.00%	1.23%	45.43%	53.34%

\* Does not include the 46,769 events with an unknown level of impact.

**Table 1c. Aggregated Impact Level by Reporter\***

Aggregated Impact Level	Total Reports	% of Total	Reported by Physician	Reported by Nurse	Reported by Other
3-6: Events not leading to permanent harm	147,228	67.09%	1.19%	52.79%	46.02%
7-10: Events leading to permanent harm, near death, or death	9,357	4.26%	3.47%	31.09%	65.44%

\* Reports by physicians and nurses were aggregated into events not leading to permanent harm and those events leading to permanent harm, near death, or death.

**Table 1d. Event Category by Level of Impact**

Level of Impact	Administrative	Adverse Clinical	Fall	Medication/Infusion	Other	All Events
Unknown	32.0%	11.4%	10.4%	16.6%	40.6%	17.6%
Unsafe environment	28.3%	13.7%	2.0%	10.6%	9.7%	13.7%
Near miss	8.7%	8.4%	0.5%	17.3%	5.7%	10.0%
No harm	23.4%	40.0%	62.0%	39.7%	28.1%	39.3%
Temporary harm	7.3%	25.1%	24.9%	15.5%	15.1%	18.8%
Permanent harm	0.2%	0.4%	0.1%	0.1%	0.2%	0.2%
Near death	0.1%	0.4%	0.0%	0.1%	0.2%	0.2%
Death	0.1%	0.6%	0.1%	0.1%	0.4%	0.3%
All events*	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

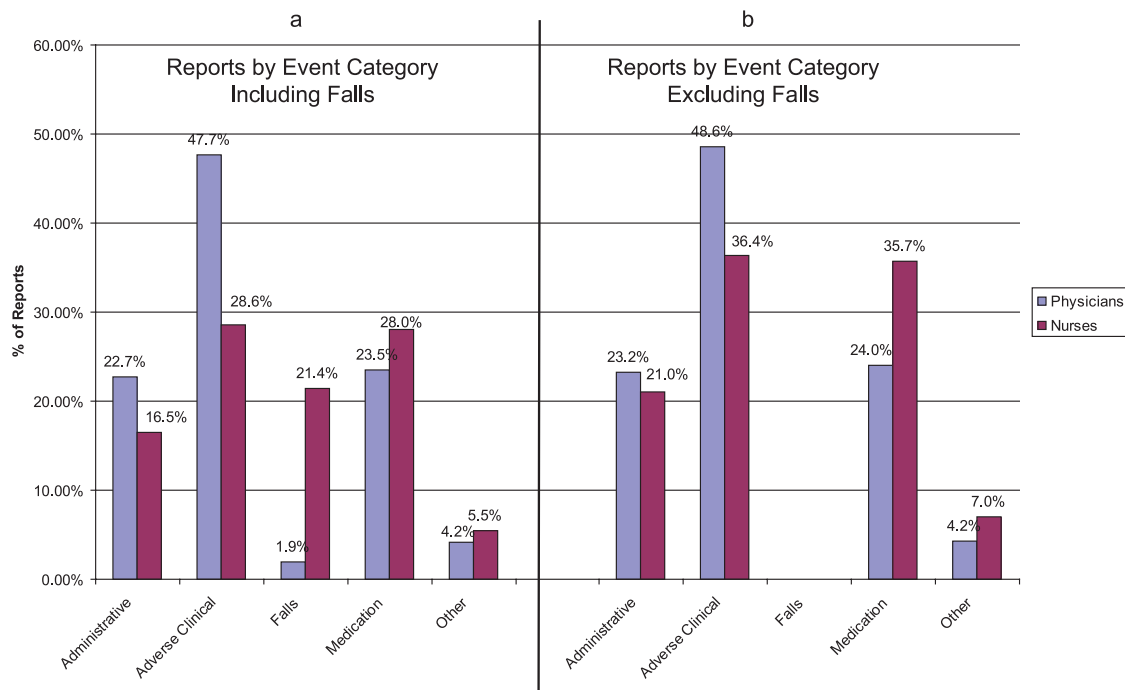
\* Column totals.

**Table 1e. Level of Impact by Event Category**

Level of Impact	Administrative	Adverse Clinical	Fall	Medication/Infusion	Other	Grand Total*
Unsafe environment	35.8%	36.7%	1.9%	22.7%	2.9%	100.0%
Near miss	15.1%	31.0%	0.7%	50.9%	2.4%	100.0%
No harm	10.2%	37.1%	20.2%	29.5%	3.0%	100.0%
Temporary harm	6.7%	48.8%	17.0%	24.1%	3.3%	100.0%
Permanent harm	11.7%	44.4%	19.9%	20.4%	3.5%	100.0%
Near death	4.9%	48.1%	18.0%	25.3%	3.7%	100.0%
Death	6.4%	58.6%	8.5%	25.0%	1.6%	100.0%
All events	17.3%	36.5%	12.8%	29.2%	4.1%	100.0%

\* Raw totals.

## Breakdown of Events by Category and Reporter



**Figure 2.** The figure depicts (a) the classification of events reported by physician and nurses and (b) breakdown of events by category and reporter excluding falls

total number of falls. The adjustment of the total reports for physicians and nurse to exclude falls is reflected in Figure 2b.

When nurses were the reporters, 16.5% of reports were administrative, 28.6% were adverse clinical, 21.4% were falls, 28.0% were medication/infusion, and 5.5% were other events (Figure 2a).\*

**Reporting Ratios of Physicians and Nurses.** To compare physician and nurse reporting, we examined the reporting ratio at each level of impact. A reporting ratio of 1.0 implies that physicians and nurses report a given level of impact at an equal fraction of their total reports. Note that although the fraction of physician reports in a category to total physician reports may have been higher than the nurse fraction in that category, nurses were always responsible for a much larger number of reports in every category. The reporting ratio was significantly below 1.0 ( $p < .01$ ) for reports that did not harm patients and was significantly greater than 1.0 ( $p < .01$ ) for reports of an unsafe environment (1.39) and of temporary harm (1.23), permanent harm (4.07), near death (5.85), or death (3.25). The reporting ratio of 0.87 was not significantly different than 1.0

for reports that were near misses (Figure 3, page 543). ANOVA showed that the reporting ratio of 0.83 was significantly less than 1.0 ( $p < 0.01$ ) for reports that did not cause permanent harm to patients and, at 4.11, was significantly greater than 1.0 ( $p < .01$ ) for reports that caused permanent harm, near death, or death. The physician-to-nurse reporting ratios for each event category are shown in Figure 4 (page 544).

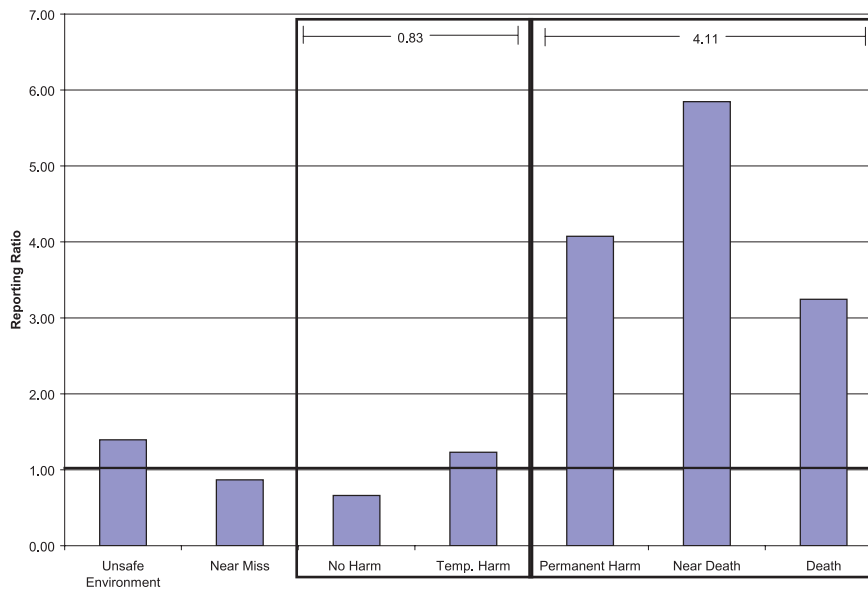
## Discussion

In this study we examined a large database of reported events, which enabled us to analyze a large number of physician reports—more than 3,000—despite their low event reporting rates. This allowed us to gain an understanding of differences in reporting practices between physicians and nurses in types of events reported and of differences in reporting at various impact levels. We found that physicians were the reporter for only 1.1% of events, while nurses were the reporter for 45.3% of events. Physicians were more likely to be the reporter for those events that had a higher impact on the patient but were less likely to be the reporter for fatal events.

We found that as the impact level of a report increased, so did the percentage of physician reports. The finding that physi-

\* Figures corresponding to Tables 1b, 1c, and 1d can be obtained from the corresponding author by e-mail request.

## Physician-to-Nurse Reporting Ratio for Each Level of Impact



Ratio at Level of Impact	Physician	Nurse	Physician Reports in Category to Total Physician Reports	Nurse Reports in Category to Total Nurse Reports	Reporting Ratio
Unsafe environment	460	12,156	0.170	0.122	1.39
Near miss	163	6914	0.060	0.069	0.87
No harm	974	54,239	0.360	0.544	0.66
Temporary harm	785	23,480	0.290	0.236	1.23
Permanent harm	272	2,459	0.100	0.025	4.07
Near death	30	189	0.011	0.002	5.85
Death	23	261	0.008	0.003	3.25
Overall	2,707	99,698	1.000	1.000	1.00
Ratio at aggregated level of impact					
Event not leading to permanent harm (3–6)	1,759	77,719	0.650	0.780	0.83
Events leading to permanent harm, near death or death (7–10)	325	2909	0.120	0.029	4.11

**Figure 3.** The figure shows the fraction of physician reports in a category to total physician reports as compared with the fraction of nurse reports in a category to total nurse reports.

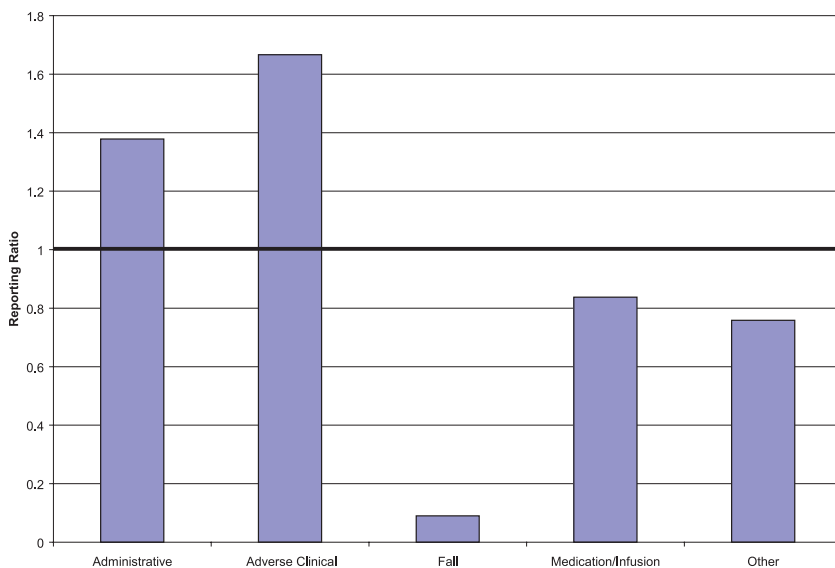
cians reported events that caused serious harm to patients at a rate that was three times higher than their average reporting rate is consistent with the finding that physicians are more likely to report if an event caused harm.<sup>10</sup> Yet, physician reports still accounted for only 3.5% of total reports at these higher impact levels. The fact that physicians were less likely to be the reporters for adverse events resulting in patient death may reflect a perception of a punitive practice environment and the fear of liability.<sup>16</sup> However, results from physician surveys and focus groups suggest that risk of malpractice does not influence

formal reporting.<sup>12,13,17,18</sup>

Physicians' lower likelihood of reporting events resulting in death may also reflect an attempt to evade the "chagrin factor" and avoid remorse by not admitting their clinical decision/action was incorrect.<sup>19</sup> Garbutt et al. found that physicians are more likely to report errors to risk management and informally to their superiors than via an ERS.<sup>17</sup>

Nurses were more likely to be the reporter for events with a lower impact level, yet nurse reporting was higher and more consistent across impact levels. They still reported permanent

## Physician-to-Nurse Reporting Ratio for Each Category



**Figure 4.** The figure shows the fraction of physician reports in a category to total physician reports as compared with the fraction of nurse reports in a category to total nurse reports.

harm, near death, or death at a rate of almost nine times that of the physicians. The decrease in nurses' likelihood of being the reporter at higher impact levels may reflect the fact that a large percentage—21.3%—of the reports that nurses submitted concerned falls—while fall reports accounted for just 12.8% of total reports. Some 87% of fall reports fell in the “did not cause harm” or “caused temporary harm” categories. Physicians submitted just 58 (0.17%) of 34,155 reports involving falls. This may reflect their attitude that reporting falls is a nursing responsibility<sup>15</sup> or the fact that physicians may not have been aware of falls that did not cause permanent harm.

The reporting patterns by physicians in an academic and a nonacademic hospital setting were not substantially different (1.14% versus 1.13%;  $p < .05$ ), thus implying that the presence of house staff did not increase reporting. The study by Osmín et al. of medical error reporting in an intensive care unit led us to expect that physicians in training would have a higher reporting rate of events than attending physicians.<sup>20</sup> However, we found that the reverse was true—the former accounted for 26.5% (versus 73.5%)—of physician reports in academic hospitals. This apparent discrepancy might be explained by our lack of information as to the number of attending physicians compared with the number of physicians in training. Nurse reporting was higher in nonacademic hospitals (51% of all reports) than in academic hospitals (42.5%), perhaps reflecting

a lower number of other reporters (that is, in addition to physicians and nurses) in the nonacademic setting.

There are several limitations in our study. First, a voluntary reporting system does not capture all events because we have no real denominator when comparing reports to total events. We did not rely on any alternative methods to attempt to identify unreported events in this study. Second, given that this was a descriptive study of an operational system, the peer review–protected nature of the database prevented the authors' access to the details of individual reports. Therefore, we did not know which doctors or nurses were reporting or any of their characteristics or how many events a given individual reported, thereby limiting our analysis on individual reporters. Nor did we know of any variability in reporting practices among the different organizations. Third, we assumed that nurses and physicians viewed identical events and

that, therefore, reporting rates would be comparable between the two groups. Finally, a theoretical limitation concerns those events that were reported by both a physician and a nurse. Such double reports were manually combined at each organization, and the report was assigned either as a physician or nurse reporter. Given the constraints of our database, these double reports could not be deconsolidated. Although some events were reported by both physicians and nurses, there were a substantial number reported only by physicians. Statistically, there is an equally likely chance that a double report would be assigned to either a physician or a nurse. It is our opinion that if a physician made the effort to fill out the report, he or she would have been likely to have done so in great detail, so that the administrator would have been more likely to add a nurse comment to the physician report (thereby assigning the report to a physician). Despite these limitations, it is our belief that the e-ERS's near-real-time capture of events rather than retrospective chart review or monitored observational studies constitutes the most cost-effective and practical way to provide a large-scale database of reported events.

In a focus-group study reported by Jeffe et al., physicians stated that they are unsure what reportable events are, did not know how to report, and feared repercussion on the basis of the lack of confidentiality when reporting events.<sup>18</sup> Physicians also stated that time and efficiency were reasons behind not report-

ing events, with the desire for a report to be filled in less than two minutes. Physicians and nurses were frustrated by the lack of feedback offered by reporting systems. We feel that the e-ERS implemented in our study, with the opportunity for easy access and reporting in a timely, confidential manner in a peer review-protected system, and ability to obtain timely feedback from hospital administration, addresses many of these concerns. Although our e-ERS does not per se offer guidance as to what to report, it is designed such that all events can and should be reported.

As summarized by the receiver operating characteristic curve for any test,<sup>21,22</sup> increasing the specificity of a test must decrease its sensitivity. Thus, if an organization chooses not to report events that are not severe, they will most likely miss some events that are more severe. Further, less severe events may nonetheless reveal problems in hospital processes that should be improved to avoid future events. Thus, we feel that all errors must be reported no matter the severity, with no need to lose sensitivity with increased specificity. It should be up to the hospital to analyze events and make this differentiation as to a report's importance. Furthermore, the reporting of minor errors and near misses is critical because it is through such reports that systemic errors can be caught and corrected before they reach the patient to cause harm. By increasing physician reports, we believe, through anecdotal observation, that physicians become more involved in patient safety and thereby contribute to the improvement of quality of care and patient safety. **J**

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